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Devendra Y. Raut

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CENTRAL COAST PATENT AGENCY, INC  
3 HANGAR WAY SUITE D  
WATSONVILLE, CA 95076

EXAMINER

CHOU, ALBERT T

ART UNIT

PAPER NUMBER

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/820,497	<b>Applicant(s)</b> RAUT ET AL.	
	<b>Examiner</b> ALBERT T. CHOU	<b>Art Unit</b> 2416	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2009 for Arguments/Remarks.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Amendment*

1. Applicant's Remarks filed on February 26, 2009 have been entered. No claims have been amended, added, or canceled. Claims 1-15 are pending in this application, with claims 1, 6 and 11 being independent.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 7,039,720 to Alfieri et al. (hereinafter "Alfieri") in view of US Patent No. 5,528,513 to Vaitzblit et al. (hereinafter "Vaitzblit")

Regarding claim 1, Alfieri teaches an edge router operating Border Gateway Protocol (BGP) in a packet network [**Figs. 1 & 5; Edge Routers 14 operating BGP in Wide Area Routed Network 10; col. 3, lines 8-22, col. 5, lines 28-30**] comprising:

a processor resource for processing events **[Fig. 5; multiple tasks 60 time-share the same physical processor in the Router 14 for processing task events; col. 6, lines 8-25];**

at least one scheduler **[Fig. 5; A context selection logic 64 is a task scheduler for scheduling tasks 60]** managing all events for processing by the processor resource **[Fig. 5; The time-sharing is accomplished in part via the context selection logic 64. As events occur that require action for a given VR, the context selection logic 64 couples the appropriate task 60 to the context area CTEXT for that VR. The task 60 then executes using the data from that context area CTEXT; col. 5, lines 35-43, col. 6, lines 30-36].**

Alfieri does not expressly teach the edge router comprises one ready list; and individual event pipelines dedicated to individual ones of BGP peers; wherein events received for processing are posted in their associated event pipelines according to the source of the events, pipelines having events to be processed insert a flag in the ready list, and the scheduler repetitively scans the ready list sequentially, and releases events to the processor resource with preset limitation per pipeline.

Vaitzblit teaches a scheduler with a weighted round-robin scheduling schemes in a network device **[Figs. 1-2; a Video File Server 20 having a Scheduler 53; col. 3, line 17]**, comprising:

at least one ready list **[Fig. 2; a block of scheduling flags 142; col. 4, lines 6-7];** and

individual event pipelines dedicated to individual ones of peers **[Fig. 2; e.g. a first and a second network interface queues 130 and 132 for managing each of interface peers, respectively; col. 3, lines 55-59]**; wherein events received for processing are posted in their associated event pipelines according to the source of the events, pipelines having events to be processed insert a flag in the ready list **[Fig. 2; A scheduling flag is used to indicate that a task has pending work and to signal the scheduler 53 that the task needs to be invoked; col. 4, lines 6-15]**, and the scheduler repetitively scans the ready list sequentially **[Fig. 5, steps 515-520- 540-515; scan the block of scheduling flags 142 based on a round-robin algorithm, i.e. sequentially; col. 3, lines 27-28, col. 7, line 61 – col. 8, line 15]**, and releases events to the processor resource with preset limitation per pipeline **[Fig. 5, steps 540-550; yielding the processing resources once all the scheduling flags are scanned or due to the time limitation; col. 8, lines 15-17; col. 3, lines 62-67]**.

Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to incorporate a scheduler with a block of scheduling flags, i.e. a ready list, to sequentially scan the pending events/tasks as taught by Vaitzblit into Alfieri's context selection logic or scheduler of the edge router, since both inventions are directed to the multiple tasks/events scheduling within a network device.

The motivation for combining the reference teachings would be to enable Alfieri's edge router to achieve improved performance even in a very large network with a large number of routes without involving expensive or extensive hardware or software modification.

Regarding claims 2, 7 and 12, Alfieri, in view of Vaitzblit, teaches individual ones of the BGP peers are virtual private routed networks (VPRNs) away from the packet network **[Alfieri: Fig. 1; VPRNs 1-3; col. 2, line 60 – col. 3, line 29]**.

Regarding claims 3, 8 and 13, Alfieri, in view of Vaitzblit, teaches the edge router wherein the preset limitation is a time limitation **[Vaitzblit: Fig. 2; col. 3, lines 62-67]**.

Regarding claims 4, 9 and 14, Alfieri, in view of Vaitzblit, the edge router wherein the preset limitation is a buffer limitation **[Vaitzblit: The real-time class 120 scheduling is suitable for tasks that require guaranteed throughput and bounded delay, which are obviously subjected to the buffer limitation; col. 3, lines 44-54]**.

Regarding claims 5, 10 and 15, Alfieri, in view of Vaitzblit, teaches the edge router comprising a first scheduler, a first ready list, and pipelines dedicated to events associated with both VPRNs and core BGP peers in the service provider network **[Alfieri: Fig. 1; Routers 14 in Wide Area Routed Network 10; col. 3, lines 4-29]**, wherein the pipelines associated with VPRNs communicate with the first scheduler and the first ready list **[See the rejection statements to claims 1 and 2 above]**.

Alfieri, in view of Vaitzblit, does not expressly teach the edge router comprising a second scheduler, a second ready list, and the pipelines associated with the core BGP peers communicate with the second scheduler and the second ready list.

However, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to recognize that the edge routers 14 in Alfieri may implement a second scheduler, a second ready list, and the pipelines associated with the core BGP peers communicate with the second scheduler and the second ready list in the same way just like scheduling for VPRNs 1-3 to one side of the edge routers 14. Thus, the limitations set forth in the claim 5 do not depart from the combining invention scope of Alfieri in view of Vaitzblit as recited in the rejection statements to claims 1 and 2.

Regarding claims 6 and 11, Alfieri teaches a method and a machine-readable medium having stored instructions that cause the method for processing events in Border Gateway Protocol (BGP) peering in an edge router in a packet network **[Figs. 1-5; Edge Routers 14 operating BGP in Wide Area Routed Network 10; col. 3, lines 8-22, col. 5, lines 28-30]**, comprising acts of:

(a) placing received events associated with BGP peers in dedicated pipelines according to the BGP source **[Fig. 5; A context selection logic 64 is a task scheduler for scheduling tasks 60 (including BGP tasks) and multiple tasks 60 time-share the same physical processor in the Router 14 for processing task events; col. 5, lines 35-43]**.

Alfieri does not expressly teach: (b) flagging a ready list by individual pipelines having events ready to be processed; and (c) scanning the ready list sequentially and

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repeatedly by a scheduler, the scheduler sending events for each pipeline to be processed to a processing resource according to a preset limitation per pipeline.

Vaitzblit teaches a scheduler with a weighted round-robin scheduling schemes in a network device **[Figs. 1-2; a Video File Server 20 having a Scheduler 53; col. 3, line 17]** comprising steps of:

(b) flagging a ready list **[Fig. 2; a block of scheduling flags 142; col. 4, lines 6-7]** by individual pipelines having events ready to be processed **Fig. 2; e.g. a first and a second network interface queues 130 and 132 for managing each of interface pipelines to be processed; col. 3, lines 55-59]**; and

(c) scanning the ready list sequentially and repeatedly by a scheduler **[Fig. 5, steps 515-520- 540-515; scan the block of scheduling flags 142 based on a round-robin algorithm, i.e. sequentially; col. 3, lines 27-28, col. 7, line 61 – col. 8, line 15]**, the scheduler sending events for each pipeline to be processed to a processing resource **[Fig. 2; A scheduling flag is used to indicate that a task has pending work and to signal the scheduler 53 that the task needs to be invoked; col. 4, lines 6-15]** according to a preset limitation per pipeline **[Figs. 2 & 5; Tasks are defined to run for a limited time before yielding control to the scheduler col. 3, lines 62-67]**.

Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to incorporate a scheduler with a block of scheduling flags, i.e. a ready list, to sequentially scan the pending events/tasks as taught by



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Vaitzblit into Alfieri's context selection logic or scheduler of the edge router, since both inventions are directed to the multiple tasks/events scheduling within a network device.

The motivation for combining the reference teachings would be to enable Alfieri's edge router to achieve improved performance even in a very large network with a large number of routes without involving expensive or extensive hardware or software modification.

### ***Response to Remarks***

3. Applicant's Remarks with respect to claims 1-15 have been considered but are not persuasive

Regarding claim 1, Applicant argues that "*Vaitzblit fails to teach, 'individual event pipelines dedicated to individual ones of BGP peers; wherein events received for processing are posted in their associated event pipelines according to the source of the events' as claimed in applicant's invention. The Examiner states that network interfaces 130 and 132 of Vaitzblit are queues, which is clearly in error*". Examiner respectfully disagrees with Applicant's misinterpretation regarding Vaitzblit's disclosures.

Specifically, Applicant argues that "*there is only one queue for posting real time packets in Vaitzblit, which is queue 134. There are no pipelines taught in the art of Vaitzblit for posting received packets, as claimed. Further, applicant argues that Vaitzblit fails to teach that pipelines having events to be processed insert a flag in the ready list*." Again, Examiner respectfully disagrees.

First, although Vaitzblit uses the terminology “*a first network interface 130 and a second network interface 132*”, the first network interface 130 and the second network interface 132, respectively, are used for “*buffering*” or “*queuing*” packets received from the network prior to being scheduled for processing. In other words, both network interfaces *buffer* the received packets in “*queuing*” manner, which is equivalent to the “*pipeline*” as Applicant calls it, for later scheduling.

Second, as described above and recited on page 4 of this Office Action, Vaitzblit clearly teaches, for example, each real-time task is also assigned a scheduling flag. A block of scheduling flags 142 (or the ready list as Applicant calls it) is shown in FIG. 2. A scheduling flag is used to indicate that a task has pending work and to signal the scheduler 53 that the task needs to be invoked. Scheduling flags may be set by interrupt service routines or by tasks of any class. In FIG. 2, interrupt service routine ISR1 144 sets the scheduling flag for RT2 124. Interrupt service routine ISR2 146 sets the scheduling flag for RT1 122. Real-time task RT2 124 sets the scheduling flag for RT3 126 [col. 4, lines 6-15].

Vaitzblit further teaches scheduling real-time tasks is done by scanning the set of scheduling flags 142 associated with the real-time tasks. For each flag that is set, the scheduler 53 invokes the corresponding task with the assigned weight as a parameter. At the completion of each unit of work, the real-time task opens up the preemption window which is used by the scheduler 53 to run all the isochronous tasks that may have arrived in the time it took the real-time task to process one unit of work. Upon

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exhausting the allowed number, or fewer, of work units, or the weight, the task voluntarily returns to the scheduler 53. After having completed one round of scanning the flags and invoking the corresponding real-time tasks, the scheduler 53 switches to the general purpose class **[col. 5, lines 1-15]**.

Thus Alfieri, in view of Vaitzblit, teaches each limitation set forth in claim 1, and claim 1 is not allowable over these references.

Regarding claims 6 and 11, Applicant argues that *"Fig. 5 and the associated text in Alfieri fail to teach or suggest placing received events associated with BGP peers in dedicated pipelines according to the BGP source, as claimed"*. Examiner respectfully disagrees

Specifically, Applicant argues that *"Alfieri fails to consider the source when assigning tasks to VRs. This is done according to time sharing, not the BGP source, as claimed"*. Examiner respectfully disagrees with Applicant's misinterpretation of Vaitzblit's disclosures.

Applicant's argument regarding the "time sharing" is irrelevant to BGP source. As Alfieri teaches that as the "events" that require action, i.e. to be scheduled, occur, the context selection logic 64 couples the appropriate task 60 to the context area CTXT for that VR. As an example, a VR is part of VPRN in which BGP protocol is used **[col. 5, lines 39-50]**. Thus the events are associated with BGP peers in dedicated pipelines according to BGP source. Therefore, Alfieri, in view of Vaitzblit, teaches each limitation

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set forth in independent claims and 11, and independent claims 6 and 11 are not allowable over these references.

Claims 2-5, 7-10 and 12-15 depend from claims 1, 6, and 11, respectively. In addition to the recited rejection to claims 1, 6 and 11, Examiner maintains the same position of rejection to each of claims 2-5, 7-10 and 12-15.

It is concluded that Alfieri's reference, in combination with Vaitzblit's reference, reads claims 1-15 through obviousness. Therefore, claims 1-15 are not allowable over these references.

### ***Conclusion***

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Albert T. Chou whose telephone number is 571-272-6045. The examiner can normally be reached on 8:30 - 17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi H. Pham, can be reached on 571-272-3179. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Albert T Chou/

Examiner, Art Unit 2416

February 27, 2009

/Chi H Pham/

Supervisory Patent Examiner, Art Unit 2416

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